



Secondary Markets Update

Presented to Commissioner Baker & Staff
December 10, 2009

Overview

Who We Are

- Spectrum Bridge - simplify and create liquidity in Secondary Markets.
- Founded in March 2007
 - MeshNetworks Mgmt. Team
 - 100+ years wireless experience
 - Venture backed
 - 35 Employees/ Orlando, FL
- Meet growing demand for wireless applications
- Create a robust secondary market where spectrum can be dynamically traded via realtime DB certification
- Deployed first TV White Spaces Network
 - Applying for TVWS DB Certification



The Spectrum Bridge Solution

- The first ***online*** marketplace for spectrum
www.SpecEx.com
- Create a ***licensed experience*** for the unlicensed user
- Powerful platform for spectrum holders and buyers to ***sell*** or ***lease*** spectrum in a trusted environment
- Provide flexible ***partition/disaggregation*** platform creating dynamic retail packages
- Monetize idle spectrum and ***optimize*** its value by matching it to pre-qualified users

Where We Are Today

- Step 1 - an “MLS” for spectrum licenses and an eBay/Amazon store front for buying, selling, leasing, researching and valuing spectrum

Step 2 - SmartWaves spectrum manager

SpecEx
THE ONLINE MARKETPLACE FOR SPECTRUM™

Accounts | Trading | Research & Pricing | Spectrum Search | Knowledge Center | Administration

Getting Started | Buy Spectrum | List Spectrum | Watching | My Bids | Request Spectrum

QUICK ACCESS LINKS

ACCOUNTS

My Profile
My Information
My Accounts
My Portfolio
Agreements

TRADING

Getting Started
Buy Spectrum
List Spectrum
Watching
My Bids
Request Spectrum

CUSTOMER SUPPORT

Need Help? Search our Online Knowledge Center.

GETTING STARTED...

***Featured listings**
To view detailed information on about any of our featured listings please select the listing name.

Location	Band	Bk/Chnl	Application Types
AMT002, AMT004, AMT005, AMT006 + 123 3000	AMTS (217-220MHz)	A & B (E)	AMR, Data, H2M, Telemetry, RFSD
AMT010 - Mountain (except BEA153)	AMTS, TVDS, narrowband (217-222 MHz)	A	AMR, Data, H2M, Telemetry, SCADA, RFSD
BEA153 - Las Vegas, NV-AZ-UT	AMTS, TVDS, narrowband (217-222 MHz)	A	AMR, Data, H2M, Telemetry, SCADA, RFSD
BEA110 - Grand Forks ND	700 MHz (800-805 MHz)	A	Broadband, Data, Video, Voice
BEA113 - Fargo-Moorhead, ND-MN	700 MHz (800-805 MHz)	A	Broadband, Data, Video, Voice
BEA173 - Guam, Northern Mariana Islands	700 MHz (800-805 MHz)	E	Broadband, Data, Video, Voice

Getting Started with SpecEx.

1. In order to trade spectrum you will need to **Open a Brokerage Account**.

2. **Associate your FCC Registration Number (FRN) with your user account**. This will enable SpecEx to find your current spectrum licenses and subleases for trade and recordkeeping.

FOR SELLERS:

3. **List your spectrum** using our **Easy Listing** or **Traditional Listing** methods.
4. **Monitor activities on your listings** to view current bids and respond to offers from buyers.
5. Receive **payments** and generate the necessary documentation.

FOR BUYERS:

3. **Browse current spectrum listings** to view available spectrum in the required area.
4. **Transfer Funds** into your Brokerage Account.
5. If there is no spectrum available in our listing area that meets your needs, **Request Spectrum** for a given geographic area, frequency, and time frame. Our business development group will find the right spectrum suited to your application.
6. Place a bid or make an offer on a spectrum listing.
7. Send **payments** and generate the necessary documentation.

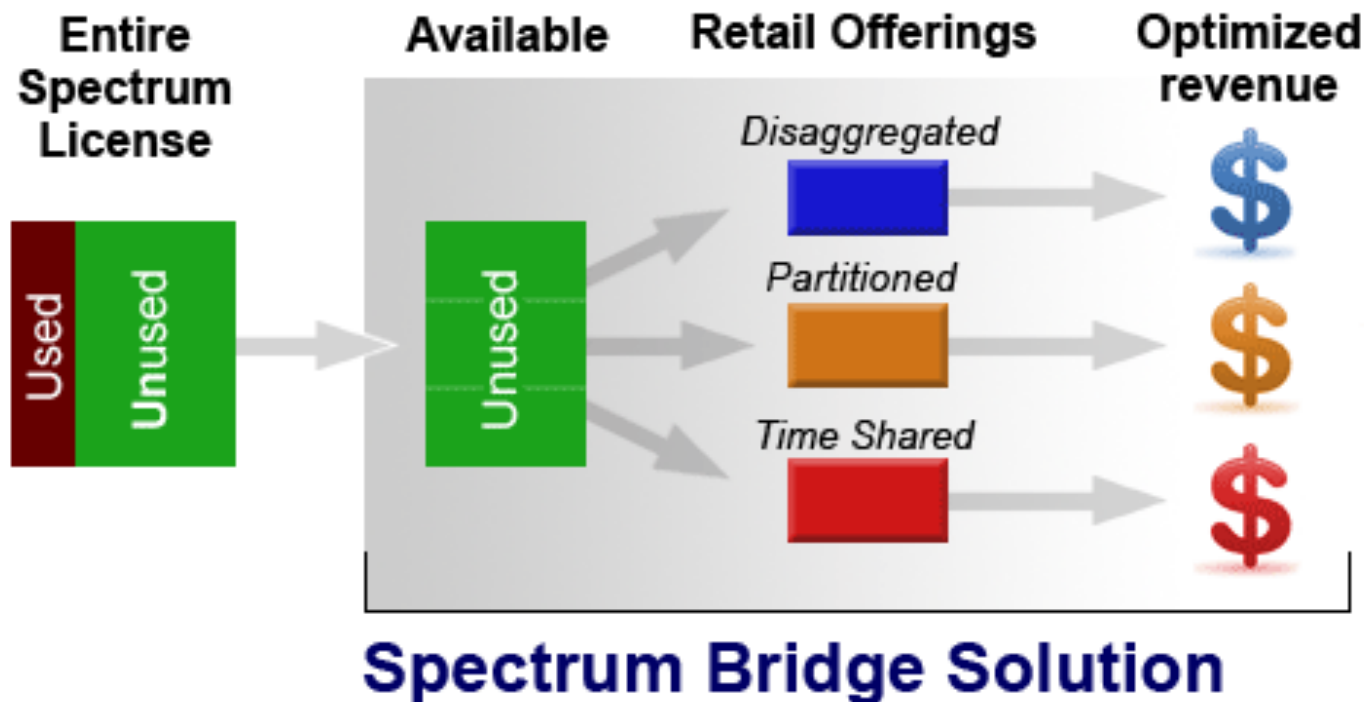
[Browse Our Spectrum Listings](#)

- Step 3 Data Base certification

Spectrum Bridge Vision

Created the world's first online marketplace for dynamic spectrum access...

by disaggregating spectrum into dynamic retail transactions

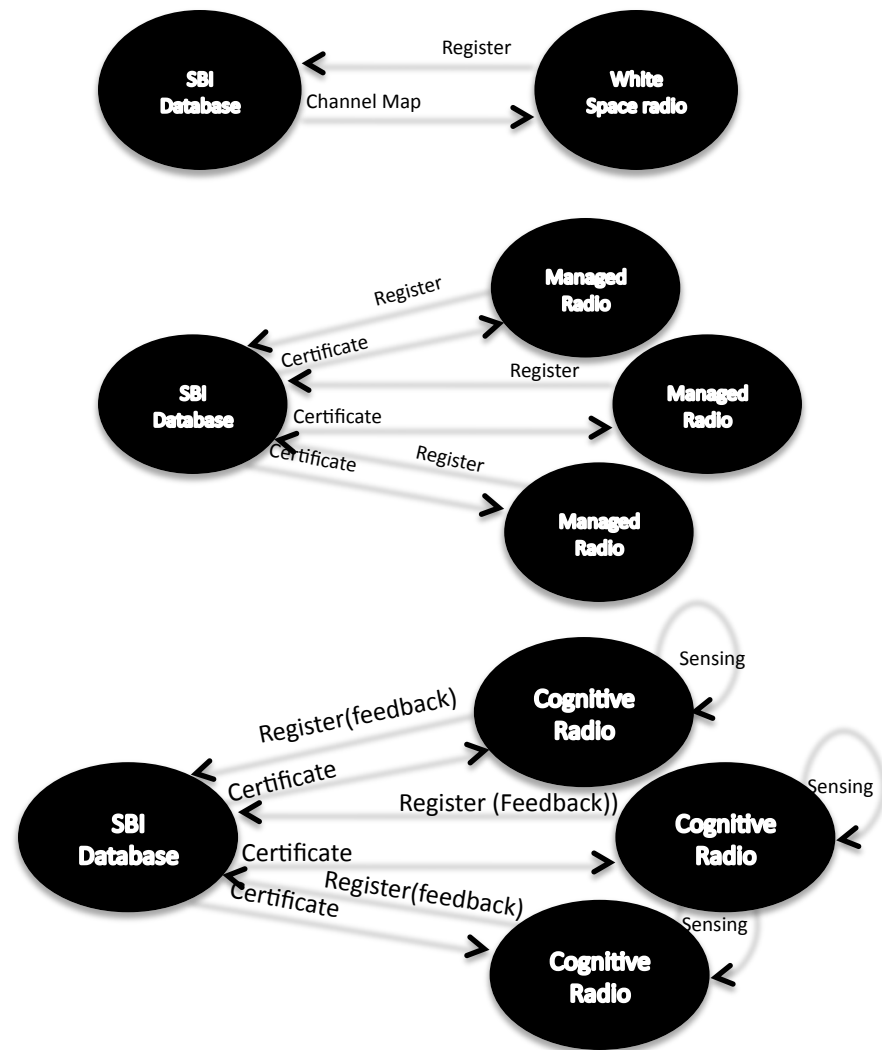


Spectrum Bridge and White Space

- We have been developing technology related to Database Managed Spectrum Access.
 - Initially we deployed this for use in SpecEx to allow partitioning and disaggregation of spectrum
 - Now being utilized for TV White Space
 - Will evolve to the more generalized case of licensed and unlicensed spectrum
 - Incorporating SmartWaves and finalizing automatic links into radio management systems (Spectrum Certificates) provides the stepping stone to our long term vision

Evolution

- TV White Space:
Database provides simple channel maps based on radio location, with no relationship to other radios
- Managed Spectrum Access:
Database provides spectrum access based on knowledge of adjacent radios and use
- Dynamic Bandwidth Allocation
Database leverages cognitive radio/networks to provide feedback on spectrum use to maximize efficiency



The Need for a Spectrum Marketplace

- Wireless innovation continues at a rapid pace driving increased demand for spectrum
- Large chunks of license holder spectrum goes unused (80% - 90%)
- FCC has issued rules supporting a secondary marketplace for spectrum
- Spectrum acquisition through auction and current secondary market model is costly and complex
- Enterprise level private networks are the primary need, and are non-competitive to the carriers' business
- Without an on-line marketplace, spectrum holders and users have limited visibility to secondary market spectrum

The Marketplace Solution

- Platform for spectrum holders and spectrum seekers to sell, or lease spectrum in a trusted environment
- Monetize idle spectrum and optimize its value by matching it to pre-qualified users
- Provide flexible partition/disaggregation platform for creating dynamic retail packages
- Tailor spectrum offerings based on user's needs (geographic, time, frequency)
- Minimize transaction costs through automated back office process



Transaction Analysis

Online analysis

- SpecEx members have access to a number of analysis and valuation tools.
- The following slides show examples of the information provided on line.

Weekly Updates For SpecEx Members

SpecEx: The Online Marketplace for Spectrum

http://www.specex.com/tools/transactions/default.aspx

chicago spire plan

SpecEx: The Online Marketplace for Spectrum

SpecEx
THE ONLINE MARKETPLACE FOR SPECTRUM™

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Spectrum Transaction Analysis - Sales and Leases

Year to Date Total Transactions

The data table below currently shows a side by side comparison of Sales and Leases total transactions to date for 2008-2009.

Year To Date through December	2008	2009	Difference	% Change
Sales	1598	1094	-504	-31%
Leases	367	253	-114	-31%
Total	1965	1347	-618	-31%

Total YTD Sales Transactions

The data table below currently shows six different categories in which the Sales radio service codes have fallen under for the previous two years.

Year To Date Sales through December	2008	2009	Difference	% Change
Coast and Ground	38	27	-11	-28%
Land Mobile Commercial	219	80	-139	-63%
Land Mobile Private	955	727	-228	-23%
Microwave	85	73	-12	-14%
Paging	18	30	12	66%
Personal Communication Services	283	157	-126	-44%
Total	1598	1094	-504	-31%

Total YTD Lease Transactions

The data table below currently shows only four categories in which the Leased radio service codes have fallen under for the previous two years.

Year To Date Leases through December	2008	2009	Difference	% Change
Land Mobile Commercial	9	0	-9	-100%

Tools

- Transaction Data
- FCC Auction Data
- Spectrum Manager
- Valuations
- Spectrum Index
- Reports/Maps

Open an Account

Start buying and selling today

Request a Demo

Take a guided tour of SpecEx

Contact Us

#407-792-1570
Click for more options

Done

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YTD License sales

Total YTD Sales Transactions

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YTD leases

Total YTD Lease Transactions

The data table below currently shows only four categories in which the Leased radio service codes have fallen under for the previous two years.

Year To Date Leases through December	2008	2009	Difference	% Change
Land Mobile Commercial	9	0	-9	-100%
Land Mobile Private	3	0	-3	-100%
Microwave	37	43	6	16%
Personal Communication Services	318	210	-108	-33%
Total	367	253	-114	-31%

Drill Down Example

- Click on a radio service code (Personal Communication Service in this example) provides the detail for YTD

Total = 157

Radio Service Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	TOTAL
AW : AWS, 1710-1755/2110-2155 MHz bands	2	6	1	13	0	1	2	2	3	3	1	34
BA : 1390-1392 MHz Band, Market Area	1	0	0	0	0	0	0	0	1	0	0	2
BB : 1392-1395 and 1432-1435 MHz Bands, Market Area	1	0	0	0	0	0	0	0	1	0	0	2
BR : Broadband Radio Service	0	3	0	0	2	3	1	0	2	3	0	14
CL : Cellular	1	0	0	0	0	0	0	0	0	0	0	1
CN : PCS Narrowband	0	0	0	0	1	0	1	0	1	0	1	4
CW : PCS Broadband	9	0	4	2	5	2	6	10	8	8	5	61
ED : Educational Broadband Service	0	3	0	2	4	0	0	2	0	0	1	12
WY : 700 MHz Lower Band, Blocks A,B,E	4	2	1	0	0	0	0	1	0	0	0	8
WZ : 700 MHz Lower Band	4	2	2	3	1	0	1	1	0	0	3	19

Detail Analysis

- On a customer by customer basis we can utilize the valuation capability from our SmartWaves asset management tools to provide pricing analysis.

Pricing analysis example

- Analysis of October 2009.
- Total of 96 Sales transactions
- 27 name changes
- 50 nominal value (narrowband channel assignments via coordinator)
- 19 significant transactions

RSC	Total Estimated Pricing per RSC
AW	\$41,395,352.00
BR	\$771,938.00
CP	\$711,310.00
CW	\$11,692,159.00

- Total of 15 lease transactions
- 2 nominal value
- 13 significant transactions
- Note for leases we normalize to a “selling price”

RSC	Total Estimated Pricing per RSC
ED	\$7,414,247.00
CW	\$18,155,860.00

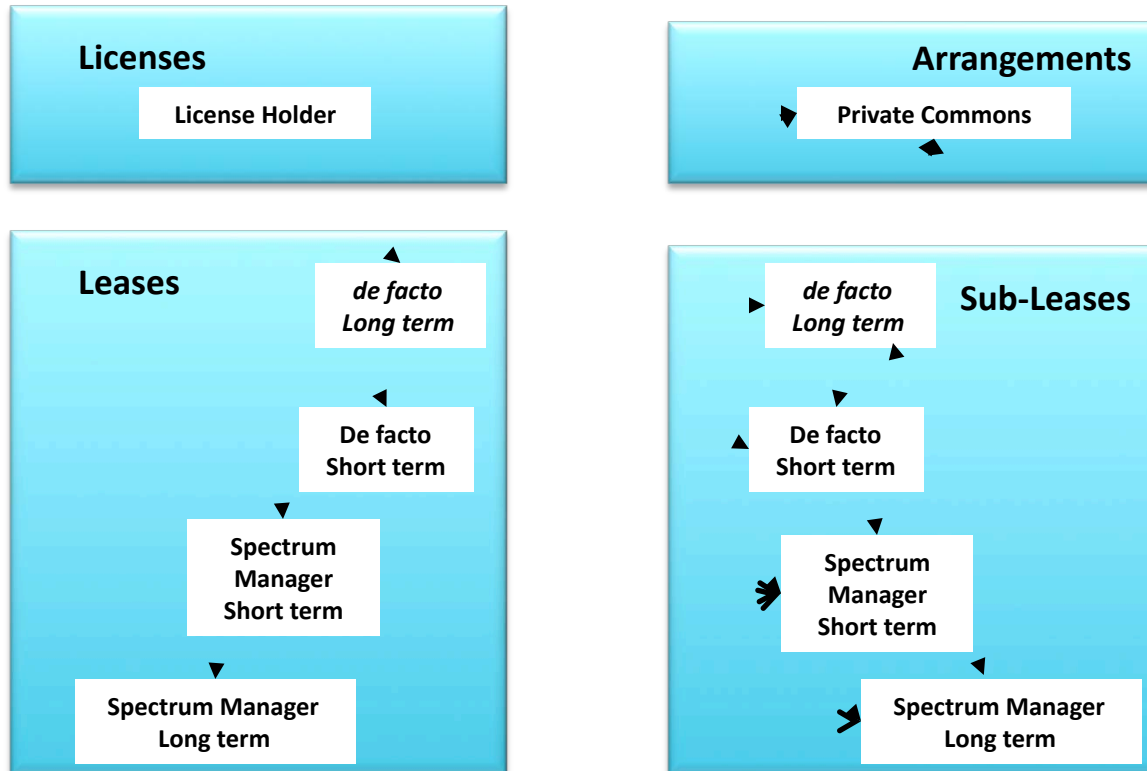


Leasing Mechanisms

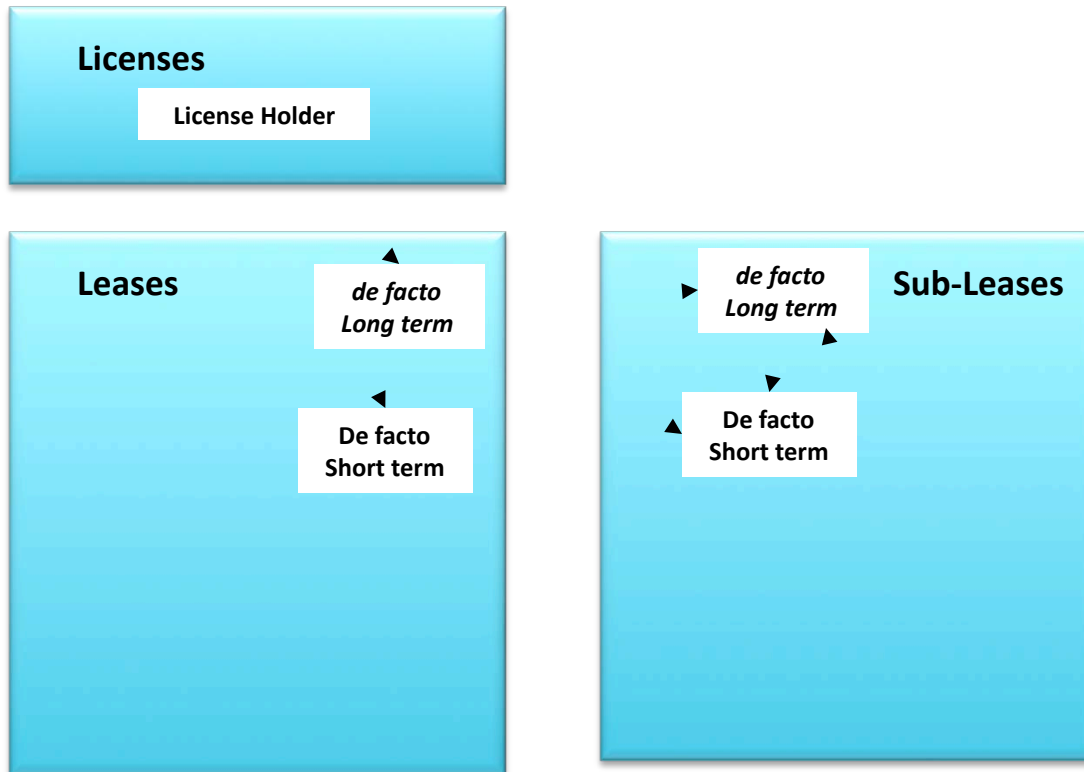
Perception and Reality

- Leasing should be simple in most cases
 - Even small things can result in lengthy delays
- Leasing should be cost effective
 - Most leases today involve significant legal input resulting in cost, and delay
- Secondary Markets are enabled by the leasing constructs.
 - We need simpler, quicker, more cost effective leasing options to enable secondary markets

Current Leasing Options



SBIs “*de facto*” Leasing Options



- simple to execute
- shifts primary responsibility for compliance to user
- supports nested sub leasing

Wish List

- In an ideal world the solution would have
 - De facto arrangement
 - (compliance/liability responsibility with lessee)
 - Minimal fee
 - Spectrum Manager lease is \$0
 - Electronic filing
 - Notification in lieu of approval
 - Minimize approval through broader predefined limits
 - Subleasing permitted (non nested)



Promoting Secondary Markets

Perception and Reality

- Advantages and opportunity not well known and understood
 - Secondary use helps build-out compliance
- Too easy to hold on to unused spectrum
 - Build-out requirements too loosely defined
 - Need to persuade license holders to offer spectrum on the secondary market
 - Mandatory wholesale



“Orphan Spectrum” Opportunity

Enabling Secondary Markets

- We define “Orphan spectrum” as the loose ends held by the FCC
 - Left over from auctions
 - Returned to the FCC
- Most of this spectrum has service rules and clear application use (examples IVDS and Part 22 licenses returned in recent years)
- Similar spectrum already on SpecEx
- How do we leverage this spectrum to create critical mass in secondary markets?



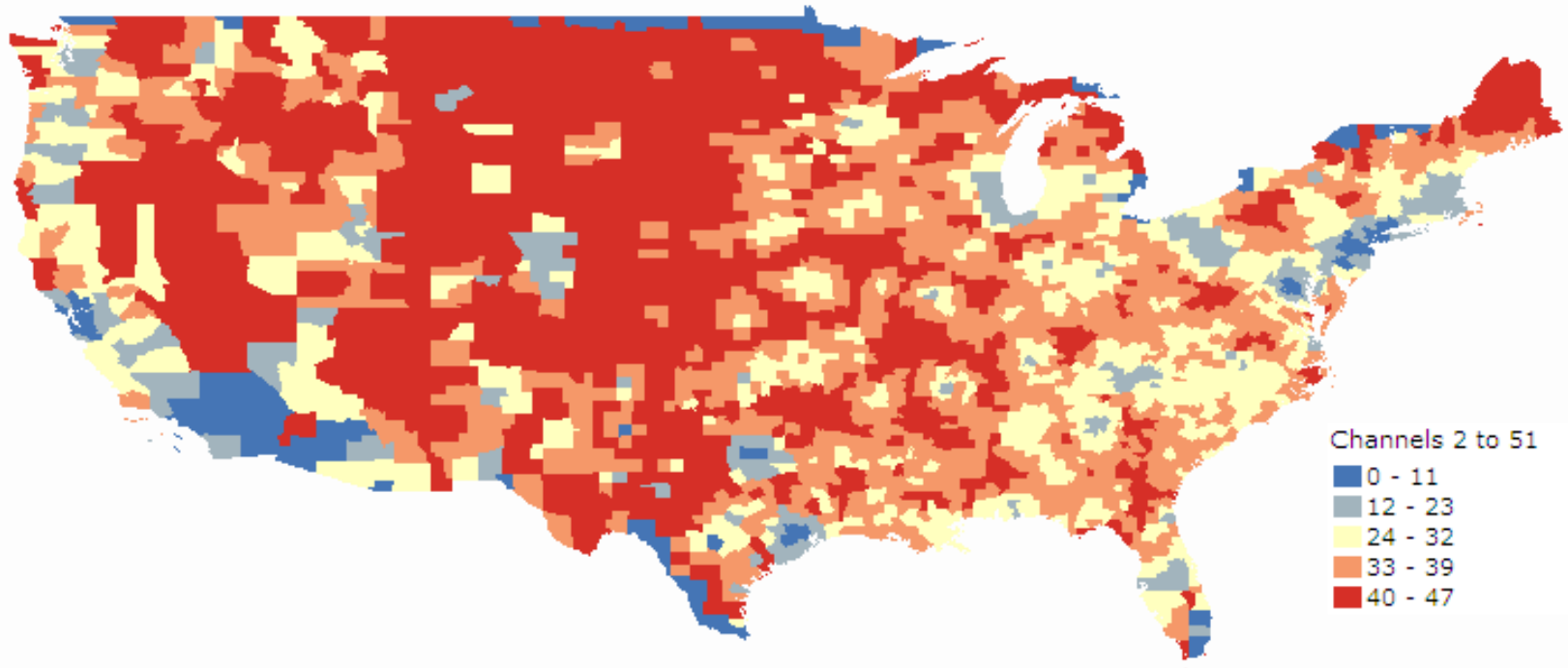
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White Spaces Considerations

White Space is at a premium in population centers

True availability is much less (when adjacent channel rules applied)



Impact of the Broadband Commission

- The Commission struck a careful balance between licensed and unlicensed use of TV band spectrum for broadband by allowing licensed use (through the 700 MHz auction) and unlicensed use (white spaces).
- Any additional spectrum recovered through repacking TV stations should continue to reflect this balance.
- White spaces devices can adapt to changes in incumbent spectrum usage (such as repacking TV stations) without major regulatory changes. Therefore proposals to reclaim TV band spectrum need not, and should not, slow down the TV white spaces proceeding.